



Analytical Laboratory

Page 1 of 16

13339 Hagers Ferry Road
Huntersville, NC 28078-7929
McGuire Nuclear Complex - MG03A2
Phone: 980-875-5245 Fax: 980-875-4349

Order Summary Report

Order Number: J13090252

Project Name: WWTS - Biweekly

Customer Name(s): Robbin Jolly, Bill Kennedy

Customer Address: 253 Plant Allen Road

Belmont, NC 28012

Lab Contact: Jason C Perkins

Phone: 980-875-5348

Report Authorized By:
(Signature)

Jason C Perkins

Date:

10/11/2013

Program Comments:

Please contact the Program Manager (Jason C Perkins) with any questions regarding this report.

Data Flags & Calculations:

Any analytical tests or individual analytes within a test flagged with a Qualifier indicate a deviation from the method quality system or quality control requirement. The qualifier description is found at the end of the Certificate of Analysis (sample results) under the qualifiers heading. All results are reported on a dry weight basis unless otherwise noted. Subcontracted data included on the Duke Certificate of Analysis is to be used as information only. Certified vendor results can be found in the subcontracted lab final report. Duke Energy Analytical Laboratory subcontracts analyses to other vendor laboratories that have been qualified by Duke Energy to perform these analyses except where noted.

Data Package:

This data package includes analytical results that are applicable only to the samples described in this narrative. An estimation of the uncertainty of measurement for the results in the report is available upon request. This report shall not be reproduced, except in full, without the written consent of the Analytical Laboratory. Please contact the Analytical laboratory with any questions. The order of individual sections within this report is as follows:

Job Summary Report, Sample Identification, Technical Validation of Data Package, Analytical Laboratory Certificate of Analysis, Analytical Laboratory QC Reports, Sub-contracted Laboratory Results, Customer Specific Data Sheets, Reports & Documentation, Customer Database Entries, Test Case Narratives, Chain of Custody (COC)

Certification:

The Analytical Laboratory holds the following State Certifications : North Carolina (DENR) Certificate #248, South Carolina (DHEC) Laboratory ID # 99005. Contact the Analytical Laboratory for definitive information about the certification status of specific methods.

Sample ID's & Descriptions:

Sample ID	Plant/Station	Collection Date and Time	Collected By	Sample Description
2013022761	ALLEN	12-Sep-13 7:03 AM	PAT NOBLE	FGD Purge Eff
2013022762	ALLEN	12-Sep-13 7:07 AM	PAT NOBLE	EQ Tank Eff
2013022763	ALLEN	12-Sep-13 7:09 AM	PAT NOBLE	BioReactor 1 Inf
2013022764	ALLEN	12-Sep-13 7:16 AM	PAT NOBLE	BioReactor 2 Inf
2013022765	ALLEN	12-Sep-13 7:12 AM	PAT NOBLE	BioReactor 2 Eff
2013022766	ALLEN	12-Sep-13 7:42 AM	PAT NOBLE	Filter Blk
6 Total Samples				

Technical Validation Review

Checklist:

- | | | |
|--|---|--|
| COC and .pdf report are in agreement with sample totals and analyses (compliance programs and procedures). | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| All Results are less than the laboratory reporting limits. | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| All laboratory QA/QC requirements are acceptable. | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |

Report Sections Included:

- | | |
|---|--|
| <input checked="" type="checkbox"/> Job Summary Report | <input checked="" type="checkbox"/> Sub-contracted Laboratory Results |
| <input checked="" type="checkbox"/> Sample Identification | <input type="checkbox"/> Customer Specific Data Sheets, Reports, & Documentation |
| <input checked="" type="checkbox"/> Technical Validation of Data Package | <input type="checkbox"/> Customer Database Entries |
| <input checked="" type="checkbox"/> Analytical Laboratory Certificate of Analysis | <input checked="" type="checkbox"/> Chain of Custody |
| <input type="checkbox"/> Analytical Laboratory QC Report | <input checked="" type="checkbox"/> Electronic Data Deliverable (EDD) Sent Separatel |

Reviewed By: DBA Account

Date: 10/11/2013

Certificate of Laboratory Analysis

Page 4 of 16

*This report shall not be reproduced, except in full.***Order # J13090252**

Site: FGD Purge Eff

Collection Date: 12-Sep-13 7:03 AM

Sample #: 2013022761

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<u>NITRITE + NITRATE (COLORIMETRIC)</u>								
Nitrite + Nitrate (Colorimetric)	18	mg-N/L		0.5	50	EPA 353.2	09/16/2013 10:55	BGN9034
<u>INORGANIC IONS BY IC</u>								
Bromide	130	mg/L		5	50	EPA 300.0	09/23/2013 16:33	JAHERMA
<u>MERCURY (COLD VAPOR) IN WATER</u>								
Mercury (Hg)	56.4	ug/L		5	100	EPA 245.1	10/04/2013 11:36	DKJOHN2
<u>TOTAL RECOVERABLE METALS BY ICP</u>								
Boron (B)	87.3	mg/L		0.5	10	EPA 200.7	09/19/2013 13:33	MHH7131
<u>DISSOLVED METALS BY ICP-MS</u>								
Selenium (Se)	111	ug/L		10	10	EPA 200.8	09/20/2013 12:29	DJSULL1
<u>TOTAL RECOVERABLE METALS BY ICP-MS</u>								
Arsenic (As)	181	ug/L		10	10	EPA 200.8	09/20/2013 11:54	DJSULL1
Cadmium (Cd)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 11:54	DJSULL1
Chromium (Cr)	169	ug/L		10	10	EPA 200.8	09/20/2013 11:54	DJSULL1
Copper (Cu)	198	ug/L		10	10	EPA 200.8	09/20/2013 11:54	DJSULL1
Nickel (Ni)	244	ug/L		10	10	EPA 200.8	09/20/2013 11:54	DJSULL1
Selenium (Se)	1520	ug/L		10	10	EPA 200.8	09/20/2013 11:54	DJSULL1
Silver (Ag)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 11:54	DJSULL1
Zinc (Zn)	241	ug/L		10	10	EPA 200.8	09/20/2013 11:54	DJSULL1
<u>SELENIUM SPECIATION - (Analysis Performed by Applied Speciation and Consulting, LLC)</u>								
Vendor Parameter	Complete					Vendor Method		V_AS&C

Site: EQ Tank Eff

Collection Date: 12-Sep-13 7:07 AM

Sample #: 2013022762

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<u>MERCURY (COLD VAPOR) IN WATER</u>								
Mercury (Hg)	44.5	ug/L		5	100	EPA 245.1	10/04/2013 11:38	DKJOHN2
<u>TOTAL RECOVERABLE METALS BY ICP</u>								
Boron (B)	95.8	mg/L		0.5	10	EPA 200.7	09/19/2013 13:37	MHH7131
<u>DISSOLVED METALS BY ICP-MS</u>								
Selenium (Se)	66.9	ug/L		10	10	EPA 200.8	09/20/2013 12:33	DJSULL1

Certificate of Laboratory Analysis

Page 5 of 16

*This report shall not be reproduced, except in full.***Order # J13090252**

Site: EQ Tank Eff

Collection Date: 12-Sep-13 7:07 AM

Sample #: 2013022762

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<u>TOTAL RECOVERABLE METALS BY ICP-MS</u>								
Arsenic (As)	134	ug/L		10	10	EPA 200.8	09/20/2013 11:58	DJSULL1
Cadmium (Cd)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 11:58	DJSULL1
Chromium (Cr)	137	ug/L		10	10	EPA 200.8	09/20/2013 11:58	DJSULL1
Copper (Cu)	149	ug/L		10	10	EPA 200.8	09/20/2013 11:58	DJSULL1
Nickel (Ni)	195	ug/L		10	10	EPA 200.8	09/20/2013 11:58	DJSULL1
Selenium (Se)	1210	ug/L		10	10	EPA 200.8	09/20/2013 11:58	DJSULL1
Silver (Ag)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 11:58	DJSULL1
Zinc (Zn)	191	ug/L		10	10	EPA 200.8	09/20/2013 11:58	DJSULL1

Site: BioReactor 1 Inf

Collection Date: 12-Sep-13 7:09 AM

Sample #: 2013022763

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<u>NITRITE + NITRATE (COLORIMETRIC)</u>								
Nitrite + Nitrate (Colorimetric)	16	mg-N/L		0.25	25	EPA 353.2	09/16/2013 10:56	BGN9034
<u>Mercury by EPA 200.8 - (Analysis Performed by Applied Speciation and Consulting, LLC)</u>								
Vendor Parameter	Complete	ug/l				Vendor Method		V_AS&C
<u>TOTAL RECOVERABLE METALS BY ICP</u>								
Boron (B)	100.0	mg/L		0.5	10	EPA 200.7	09/19/2013 13:41	MHH7131
<u>DISSOLVED METALS BY ICP-MS</u>								
Selenium (Se)	65.2	ug/L		10	10	EPA 200.8	09/20/2013 12:36	DJSULL1
<u>TOTAL RECOVERABLE METALS BY ICP-MS</u>								
Arsenic (As)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 12:01	DJSULL1
Cadmium (Cd)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 12:01	DJSULL1
Chromium (Cr)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 12:01	DJSULL1
Copper (Cu)	14.3	ug/L		10	10	EPA 200.8	09/20/2013 12:01	DJSULL1
Nickel (Ni)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 12:01	DJSULL1
Selenium (Se)	66.1	ug/L		10	10	EPA 200.8	09/20/2013 12:01	DJSULL1
Silver (Ag)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 12:01	DJSULL1
Zinc (Zn)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 12:01	DJSULL1
<u>SELENIUM SPECIATION - (Analysis Performed by Applied Speciation and Consulting, LLC)</u>								
Vendor Parameter	Complete					Vendor Method		V_AS&C

Certificate of Laboratory Analysis

Page 6 of 16

*This report shall not be reproduced, except in full.***Order # J13090252**

Site: BioReactor 2 Inf
Collection Date: 12-Sep-13 7:16 AM

Sample #: 2013022764
Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<u>Mercury by EPA 200.8 - (Analysis Performed by Applied Speciation and Consulting, LLC)</u>								
Vendor Parameter	Complete	ug/l				Vendor Method		V_AS&C
<u>TOTAL RECOVERABLE METALS BY ICP</u>								
Boron (B)	118	mg/L		0.5	10	EPA 200.7	09/19/2013 13:45	MHH7131
<u>TOTAL RECOVERABLE METALS BY ICP-MS</u>								
Arsenic (As)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 12:05	DJSULL1
Cadmium (Cd)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 12:05	DJSULL1
Chromium (Cr)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 12:05	DJSULL1
Copper (Cu)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 12:05	DJSULL1
Nickel (Ni)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 12:05	DJSULL1
Selenium (Se)	10.9	ug/L		10	10	EPA 200.8	09/20/2013 12:05	DJSULL1
Silver (Ag)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 12:05	DJSULL1
Zinc (Zn)	< 10	ug/L		10	10	EPA 200.8	09/20/2013 12:05	DJSULL1

Site: BioReactor 2 Eff
Collection Date: 12-Sep-13 7:12 AM

Sample #: 2013022765
Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<u>NITRITE + NITRATE (COLORIMETRIC)</u>								
Nitrite + Nitrate (Colorimetric)	< 0.01	mg-N/L		0.01	1	EPA 353.2	09/16/2013 10:57	BGN9034
<u>INORGANIC IONS BY IC</u>								
Bromide	280	mg/L		5	50	EPA 300.0	09/23/2013 16:52	JAHERMA
<u>Mercury by EPA 200.8 - (Analysis Performed by Applied Speciation and Consulting, LLC)</u>								
Vendor Parameter	Complete	ug/l				Vendor Method		V_AS&C
<u>TOTAL RECOVERABLE METALS BY ICP</u>								
Boron (B)	141	mg/L		0.5	10	EPA 200.7	09/19/2013 13:50	MHH7131
<u>TOTAL RECOVERABLE METALS BY ICP-MS</u>								
Arsenic (As)	< 5	ug/L		5	5	EPA 200.8	09/20/2013 12:08	DJSULL1
Cadmium (Cd)	< 5	ug/L		5	5	EPA 200.8	09/20/2013 12:08	DJSULL1
Chromium (Cr)	< 5	ug/L		5	5	EPA 200.8	09/20/2013 12:08	DJSULL1
Copper (Cu)	< 5	ug/L		5	5	EPA 200.8	09/20/2013 12:08	DJSULL1
Nickel (Ni)	< 5	ug/L		5	5	EPA 200.8	09/20/2013 12:08	DJSULL1
Selenium (Se)	6.41	ug/L		5	5	EPA 200.8	09/20/2013 12:08	DJSULL1
Silver (Ag)	< 5	ug/L		5	5	EPA 200.8	09/20/2013 12:08	DJSULL1
Zinc (Zn)	< 5	ug/L		5	5	EPA 200.8	09/20/2013 12:08	DJSULL1

Certificate of Laboratory Analysis

Page 7 of 16

This report shall not be reproduced, except in full.

Order # J13090252

Site: BioReactor 2 Eff

Collection Date: 12-Sep-13 7:12 AM

Sample #: 2013022765

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<u>SELENIUM SPECIATION - (Analysis Performed by Applied Speciation and Consulting, LLC)</u>								
Vendor Parameter	Complete					Vendor Method		V_AS&C
<u>TOTAL DISSOLVED SOLIDS</u>								
TDS	9900	mg/L		25	1	SM2540C	09/18/2013 14:37	DSBAKE1

Site: Filter Blk

Collection Date: 12-Sep-13 7:42 AM

Sample #: 2013022766

Matrix: OTHER

Analyte	Result	Units	Qualifiers	RDL	DF	Method	Analysis Date/Time	Analyst
<u>DISSOLVED METALS BY ICP-MS</u>								
Selenium (Se)	< 1	ug/L		1	1	EPA 200.8	09/20/2013 12:26	DJSULL1



**APPLIED SPECIATION
AND CONSULTING, LLC**

18804 Northcreek Parkway Bothell, WA, 98011
Tel: (425) 483-3300 Fax: (425) 483-9818
www.appliedspeciation.com

October 1, 2013

Jay Perkins
Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd.
Huntersville, NC 28078
(704) 875-5245

Project: Allen - FGD WWTS (Bi-Monthly Routine) (LIMS# J13090252)

Mr. Perkins,

Attached is the report associated with four (4) aqueous samples submitted for total mercury and selenium speciation analysis on September 13, 2013. The samples were received in a sealed cooler at -0.1°C on September 17, 2013. Selenium speciation analysis was performed via ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS). Mercury quantitation was performed via cold vapor inductively coupled plasma mass spectrometry (CV-ICP-MS). Any issues associated with the analysis are addressed in the following report.

If you have any questions, please feel free to contact me at your convenience.

Sincerely,

A handwritten signature in black ink, appearing to read "Jeremy Maute".

Jeremy Maute
Project Coordinator
Applied Speciation and Consulting, LLC

Applied Speciation and Consulting, LLC

Report prepared for:

Jay Perkins
Duke Energy Analytical Laboratory
Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd.
Huntersville, NC 28078

Project: Allen - FGD WWTS (Bi-Monthly Routine) (LIMS# J13090252)

October 1, 2013

1. Sample Reception

Three (3) aqueous samples were submitted for selenium speciation analysis on September 13, 2013. Three (3) additional samples were submitted for total mercury quantitation. All samples were received in acceptable condition on September 17, 2013 in a sealed container at -0.1°C.

All samples were received in a laminar flow clean hood, void of trace metals contamination and ultra-violet radiation, and were designated discrete sample identifiers. The 40mL borosilicate glass vials submitted for total mercury were preserved with bromine monochloride (BrCl) solution. The resulting samples were stored in a secure polyethylene container, known to be free from trace metals contamination, until the analyses could be performed.

An aliquot of each sample requiring selenium speciation evaluation was filtered (0.45µm) and each filtrate was stored in a secure, monitored cryofreezer (maintained at a temperature of -80°C) until selenium speciation analysis could be performed via ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS).

2. Sample Preparation

All sample preparation is performed in laminar flow clean hoods known to be free from trace metals contamination. All applied water for dilutions and sample preservatives are monitored for contamination to account for any biases associated with the sample results.

Total Mercury Quantitation by CV-ICP-MS All samples and preparation blanks for total mercury quantitation were preserved with 2% (v/v) BrCl. The resulting samples were analyzed for mercury via cold vapor inductively coupled plasma mass spectrometry (CV-ICP-MS).

Selenium Speciation Analysis by IC-ICP-CRC-MS Prior to analysis, an aliquot of each sample was filtered with a syringe filter (0.45 μ m) and injected directly into a sealed autosampler vial. No further sample preparation was performed as any chemical alteration of a sample may shift the equilibrium of the system, resulting in changes in speciation ratios.

3. Sample Analysis

All sample analysis is preceded by a minimum of a five-point calibration curve spanning the entire concentration range of interest. Calibration curves are performed at the beginning of each analytical day. All calibration curves, associated with each species of interest, are standardized by linear regression resulting in a response factor. All sample results are **instrument blank corrected** to account for any operational biases associated with the analytical platform.

Prior to sample analysis, all calibration curves are verified using second source standards which are identified as initial calibration verification standards (ICV).

Ongoing instrument performance is identified by the analysis of continuing calibration verification standards (CCV) and continuing calibration blanks (CCB) at a minimum interval of every ten analytical runs.

Total Mercury Quantitation by CV-ICP-MS The sample fractions for total mercury quantitation were analyzed by cold vapor inductively coupled plasma mass spectrometry (CV-ICP-MS) on September 20, 2013. Aliquots of each sample are reacted with a reductant in-line and transported to a gas-liquid separator. The volatile elemental mercury that is formed is then swept by a stream of argon gas into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and separated on the basis of their mass-to-charge ratio (m/z) by a mass spectrometer. A solid-state detector detects ions transmitted through the mass analyzer and the resulting current is processed by a data handling system.

Selenium Speciation Analysis by IC-ICP-CRC-MS Each sample for selenium speciation analysis was analyzed by ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS) on September 21, 2013. An aliquot of each sample is injected onto an anion exchange column and mobilized by a basic ($\text{pH} > 7$) gradient. The eluting selenium species are then introduced into a radio frequency (RF) plasma where energy-transfer processes cause desolvation, atomization, and ionization. The ions are extracted from the plasma through a differentially-pumped vacuum interface and travel through a pressurized chamber (CRC) containing a reaction gas which preferentially reacts with interfering ions of the same target mass to charge ratios (m/z). A solid-state detector detects ions transmitted through the mass analyzer and the resulting current is processed by a data handling system.

Retention times for each eluting species are compared to known standards for species identification.

4. Analytical Issues

The overall analyses went well and no significant analytical issues were encountered. All quality control parameters associated with these samples were within acceptance limits with the following exception:

The selenite and selenocyanate results for the preparation blank identified as PBW4 were determined to be statistical outliers upon application of the Grubbs test. No selenium species were detected in any of the other blanks (*i.e.*, preparation blanks and continuing calibration blanks) associated with this sample batch. The results for PBW4 have therefore been excluded from all calculations since these values are deemed to be unrepresentative of the preparation blanks and the submitted samples.

The estimated method detection limits (eMDLs) for selenite, selenate, and selenocyanate are generated from replicate analyses of the lowest standard in the calibration curve. Not all selenium species are present in preparation blanks; therefore, eMDL calculations based on preparation blanks are artificially biased low.

The eMDL for methylseleninic acid and selenomethionine is calculated from the average eMDL of selenite, selenate, and selenocyanate. The calibration does not contain methylseleninic acid or selenomethionine due to impurities in these standards which would bias the results for other selenium species.

The eMDL for mercury has been calculated using the standard deviation of the preparation blanks preserved and analyzed concurrently with the submitted samples.

If you have any questions or concerns regarding this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish at the end.

Jeremy Maute
Project Coordinator
Applied Speciation and Consulting, LLC

Total Mercury & Selenium Speciation Results for Duke Energy

Project Name: Allen - FGD WWTS (Bi-Monthly Routine)

Contact: Jay Perkins

LIMS #J13090252

Date: October 1, 2013

Report Generated by: Jeremy Maute

Applied Speciation and Consulting, LLC

Sample Results

Sample ID	Total Hg	Se(IV)	Se(VI)	SeCN	MeSe(IV)	SeMe	Unknown Se Species (n)
FGD Purge Eff	NR	45.9	39.0	ND (< 1.3)	1.8	ND (< 1.4)	0 (0)
BioReactor 1 Inf	0.245	10.0	36.0	ND (< 0.33)	1.20	ND (< 0.36)	0 (0)
BioReactor 2 Inf	0.196	NR	NR	NR	NR	NR	NR
BioReactor 2 Eff	0.0307	ND (< 0.47)	ND (< 0.28)	ND (< 0.33)	ND (< 0.36)	ND (< 0.36)	0 (0)

All results reflect the applied dilution and are reported in µg/L

NR = Analysis not requested

ND = Not detected at the applied dilution

SeCN = Selenocyanate

MeSe(IV) = Methylseleninic acid

SeMe = Selenomethionine

Unknown Se Species = Total concentration of all unknown Se species observed by IC-ICP-MS

n = number of unknown Se species observed

Total Mercury & Selenium Speciation Results for Duke Energy

Project Name: Allen - FGD WWTS (Bi-Monthly Routine)

Contact: Jay Perkins

LIMS #J13090252

Date: October 1, 2013

Report Generated by: Jeremy Maute

Applied Speciation and Consulting, LLC

Quality Control Summary - Preparation Blank Summary

Analyte (µg/L)	PBW1	PBW2	PBW3	PBW4	Mean	StdDev	eMDL*	eMDL 5x	eMDL 250x	eMDL 1000x
Hg	0.001	0.0011	0.0009	0.0003	0.0008	0.0004	0.0002	0.0011	-	-
Se(IV)	0.000	0.000	0.000	1.967**	0.000	0.000	0.002	-	0.47	1.9
Se(VI)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	-	0.28	1.1
SeCN	0.000	0.000	0.000	0.249**	0.000	0.000	0.001	-	0.33	1.3
MeSe(IV)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	-	0.36	1.4
SeMe	0.000	0.000	0.000	0.000	0.000	0.000	0.001	-	0.36	1.4

eMDL = Estimated Method Detection Limit

*Please see narrative regarding eMDL calculations

**Se(IV) and SeCN results for PBW4 qualified as a Grubb's Outliers. Please see narrative.

Quality Control Summary - Certified Reference Materials

Analyte (µg/L)	CRM	True Value	Result	Recovery
Hg	NIST 1641d	1568	1620	103.3
Se(IV)	LCS	4.79	4.89	102.1
Se(VI)	LCS	4.74	4.63	97.8
SeCN	LCS	4.46	4.51	101.0
MeSe(IV)	LCS	3.24	3.20	99.0
SeMe	LCS	4.66	4.54	97.4

Total Mercury & Selenium Speciation Results for Duke Energy
 Project Name: Allen - FGD WWTS (Bi-Monthly Routine)

Contact: Jay Perkins

LIMS #J13090252

Date: October 1, 2013

Report Generated by: Jeremy Maute
 Applied Speciation and Consulting, LLC

Quality Control Summary - Matrix Duplicates

Analyte (µg/L)	Sample ID	Rep 1	Rep 2	Mean	RPD
Hg	Batch QC	0.0062	0.0059	0.0061	5.0
Se(IV)	BioReactor 2 Eff	ND (< 0.47)	0.51	NC	NC
Se(VI)	BioReactor 2 Eff	ND (< 0.28)	ND (< 0.28)	NC	NC
SeCN	BioReactor 2 Eff	ND (< 0.33)	ND (< 0.33)	NC	NC
MeSe(IV)	BioReactor 2 Eff	ND (< 0.36)	ND (< 0.36)	NC	NC
SeMe	BioReactor 2 Eff	ND (< 0.36)	ND (< 0.36)	NC	NC

ND = Not detected at the applied dilution

NC = Value was not calculated due to one or more concentrations below the eMDL

Quality Control Summary - Matrix Spike/ Matrix Spike Duplicate

Analyte (µg/L)	Sample ID	Spike Conc	MS Result	Recovery	Spike Conc	MSD Result	Recovery	RPD
Hg	Batch QC	2.000	2.226	111.0	2.000	2.250	112.2	1.1
Se(IV)	BioReactor 2 Eff	1390	1445	104.0	1390	1441	103.7	0.3
Se(VI)	BioReactor 2 Eff	1261	1251	99.2	1261	1249	99.0	0.2
SeCN	BioReactor 2 Eff	1144	1066	93.2	1144	1063	92.9	0.3

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM



Duke Energy Analytical Laboratory

Mail Code MGO3A2 (Building 7405)
13339 Hagers Ferry Rd
Huntersville, N. C. 28078
(704) 875-5245
Fax: (704) 875-4349

Analytical Laboratory Use Only

LIMS # 313090252	MATRIX OTHER	Samples Originating From NC X SC
Logged By D. Baker	Date & Time 9/13/13 08:63	SAMPLE PROGRAM Water _____ Drinking Water RCRA Waste _____
Vendor ASC		Ground NPDES UST _____
Cooler Temp (C) 10C		

Page 16 of 16

DISTRIBUTION
ORIGINAL to LAB.
COPY to CLIENT

1) Project Name Allen - FGD WWTS (Bi-Monthly Routine)	2) Phone No:
2) Client: Robbin Jolly, Bill Kennedy	4) Fax No:
5) Business Unit: 20003	6) Process: BMCEFGD
8) Oper. Unit: AS00	10) Resp. Center:

AS&C
PO#650910

MR #

Customer to complete all appropriate non-shaded areas.

Sampling conducted: 2nd and 4th Monday

LAB USE ONLY
Lab ID
2013022761
2762
2763
2764
2765
2766

Customer to complete appropriate columns to right

Se Speciation Bottle ID	Sample Description or ID	Date	Time	Signature	17 Comp.	18 Grab	TDS	Br (Dionex)	Metals* + Hg 245.1	Se, soluble (no dig.)	NO3-NO2	Hg 200.8 (V_AS&C)	Se, speciation - vendor to AS&C (important to place filled bottle back into both baggies)
	FGD Purge Eff	9-12-13	0703	Patricia Noble				1	1	1	1		1
	EQ Tank Eff.	9-12-13	0707	Patricia Noble					1	1			
	BioReactor 1 Inf	9-12-13	0709	Patricia Noble					1**	1	1	1	1
	BioReactor 2 Inf	9-12-13	0716	Patricia Noble					1**			1	
	BioReactor 2 Eff	9-12-13	0712	Patricia Noble			1	1	1**		1	1	1
	Filter Blk	9-12-13	0742	Patricia Noble						1			
	Metals Trip Blk	Not IA	Cooler						1**				
Filtering of soluble Se performed in the field													
Return kit to Ray Lidke, @ Allen													

Customer to sign & date below fill out from left to right.

1) Relinquished By Daniel S. Baker	Date/Time 9/13/13 1400	2) Accepted By Daniel S. Baker	Date/Time 9/13/13 0753
3) Relinquished By	Date/Time	4) Accepted By	Date/Time
5) Relinquished By	Date/Time	6) Accepted By	Date/Time
7) Relinquished By	Date/Time	8) Accepted By	Date/Time
9) Seal/Locked By	Date/Time	10) Seal/Lock Opened By	Date/Time
11) Seal/Locked By	Date/Time	12) Seal/Lock Opened By	Date/Time
Comments			

* Metals=As, Cd, Cr, Cu, Ni, Se, Ag, Zn by TRM/IMS.

B by TRM/ICP

1**=No Hg analyzed

Customer, IMPORTANT!
Please indicate desired turnaround.

22 Requested Turnaround

21 Days _____

*7 Days _____

*48 Hr _____

*Other _____

* Add. Cost Will Apply